

***EULECANIUM EXCRESCENS* (FERRIS) (HEMIPTERA:
COCCIDAE), AN ASIAN PEST OF WOODY ORNAMENTALS
AND FRUIT TREES, NEW TO BRITAIN**

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ABSTRACT

Eulecanium excrescens (Ferris) is reported causing serious damage to ornamental *Wisteria* plants in Greater London, England. This is the first record of this polyphagous Asian pest in Europe. In China, it is a pest of apple, pear and peach trees although in the USA it does not cause economic damage. The host range, biology, geographical distribution and economic importance of *E. excrescens* are reviewed. *Coccophagus obscurus* Westwood (Hymenoptera: Aphelinidae) is recorded parasitising the scale for the first time.

INTRODUCTION

In the autumn of 2001, a member of the public reported that unusually large, soft-scale insects (Hemiptera: Coccidae) were causing leaf loss and dieback to a 15 m tall *Wisteria* sp. plant in a private garden in Vauxhall, London. Samples received at the Central Science Laboratory (CSL), via Andrew Halstead of the Royal Horticultural Society (RHS), could not be identified at the time because only old, heavily-sclerotised, post-reproductive adult females and second-instar nymphs were present. However, repeat samples were regularly sent to the Central Science Laboratory until April 2002, when the presence of young adult females allowed the identity of the pest to be confirmed as *Eulecanium excrescens* (Ferris). This species is known as the 'Excrecent scale' in the USA and is now called the 'Wisteria scale' in the UK. A follow-up visit to the garden by the Plant Health and Seeds Inspectorate (PHSI) found enormous numbers of the pest on *Wisteria* sp. and smaller numbers on cherry (*Prunus* sp.) and South African trumpet vine (*Podranea ricasoliana* (Tanfani) T. Sprague). A limited survey of *Wisteria* spp. in Central London found *E. excrescens* at eight further locations during 2002 and 2003. The presence of this new pest was publicised by the Department for Environment, Food and Rural Affairs (Defra) (Anon., 2002; Malumphy & Matthews, 2002) and widely reported in the media, including the radio, national broadsheets, magazines and on the internet (Anon., 2003a, 2003b, 2003c, 2003d, 2003e; Gianfrancesco, 2002; Whitsey, 2003). The purpose of this communication is to publish collection details for the first time and review the host range, biology, geographical distribution and economic importance of *E. excrescens*.

Slide-mounted specimens of *E. excrescens* have been deposited at the Central Science Laboratory and the Natural History Museum, London (BMNH). Dry specimens have also been stored at the Central Science Laboratory.

DETECTION AND IDENTIFICATION

All developmental stages of *E. excrescens* occur on the bark of the host plant. The first- and second-nymphal instars also occur on the undersides of foliage. Adult females are globular, dark brown and usually covered in a grey powdery wax that resembles mould growth (Figs. 1 & 2), but the waxy bloom is lost in older specimens

(Fig. 3). The adults attain a length of 13 mm and height of 10 mm and are larger than any other species of Coccidae found in Britain. The first instars are orange (Fig. 4), and second and third instars brown with discrete blocks of translucent wax dorsally (Fig. 2).

Teneral adult females are required for identification and were described and illustrated by Gill (1988) and Kosztarab (1996); both provided diagnostic keys. *Eulecanium excrescens* may be distinguished from the six native British species of *Eulecanium* by the high density of multilocular pores present on the ventral surface between the posterior and anterior spiracles, extending over the head as far as the antennal bases. The multilocular pores on the ventral surface of the native *Eulecanium* spp. are sparse between the posterior and anterior spiracles and are rarely present near the antennal bases.

HOST PLANTS AND BIOLOGY

Eulecanium excrescens is highly polyphagous and is recorded feeding on many deciduous orchard and ornamental trees in the USA (Essig, 1958; Gill, 1988; Kosztarab, 1996). Many of the known host plants are widely grown in the UK, for example, apple (*Malus* spp.), almond (*Prunus dulcis* (Mill.) D.A. Webb), apricot (*Prunus armeniaca* L.), cherry (*Prunus* spp.), elm (*Ulmus* spp.), peach (*Prunus persica* (L.) Stokes), pear (*Pyrus communis* L.), sycamore (*Acer pseudoplatanus* L.), walnut (*Juglans regia* L.) and *Wisteria* spp. The last appears to be a preferred host genus in both the USA and the UK.

The following biological observations were made on populations of *E. excrescens* breeding on *Wisteria* sp. in London between November 2001 and May 2003. *Eulecanium excrescens* had one generation a year and appeared to be parthenogenetic, as no male nymphs or adults were observed in the large samples examined. The nymphs overwintered and reached maturity in April. Eggs were laid under the body of the female, which became strongly concave, hard and sclerotised. Each female laid approximately 2000 eggs, which hatched over several days but the first instars emerged en masse (Fig. 3) from the end of May to the end of June. The nymphs fed on the foliage before moving to the woody parts of the plant in the autumn prior to leaf fall.

A low level of parasitism was observed in populations of *E. excrescens* collected in London, and *Coccophagus obscurus* Westwood (Hymenoptera: Aphelinidae) was reared from parasitised scales for the first time. In China, natural enemies of *E. excrescens* include the beetle, *Anthribus niveovariegatus* (Roelofs) (Coleoptera: Anthribidae) and an unidentified entomopathogenic fungus (Deng, 1985).

GEOGRAPHICAL DISTRIBUTION

Eulecanium excrescens originated from Asia and has been accidentally introduced to the USA, where it has been recorded from California, Connecticut, New York, Oregon and Pennsylvania (Kosztarab, 1996). The origin of the UK outbreaks is unknown, although the size of the pest populations, their distribution and the extent of damage to *Wisteria* sp. plants, suggest that *E. excrescens* has been present in London for several years. This is the first record of *E. excrescens* in Europe.

It is possible that *E. excrescens* is more widespread within London than is currently known, since potential host genera such as *Acer*, *Malus*, *Prunus*, *Ulmus* and *Wisteria* are very common and the first-instar scales are readily dispersed on air currents, such as those generated by passing traffic. Furthermore, the presence of

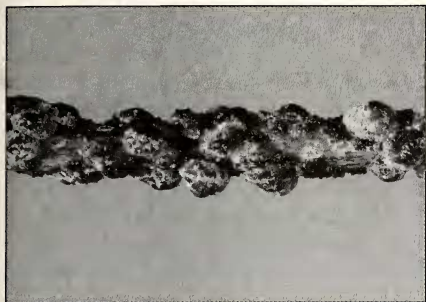


Fig. 1. Young adult female *Eulecanium excrescens* on *Wisteria* sp.

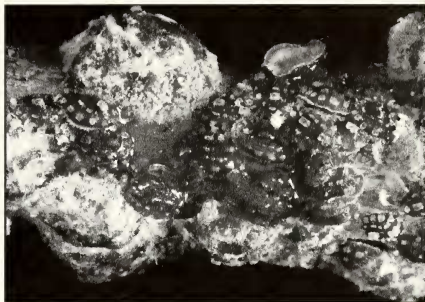


Fig. 2. Adult female *Eulecanium excrescens* covered in a grey powdery wax bloom and nymphs with small rectangular wax plates.



Fig. 3. Post-reproductive adult female *Eulecanium excrescens* on *Wisteria* sp. The scale bar is in mm.



Fig. 4. Swarming horde of first instar *Eulecanium excrescens*.

E. excrescens in the Pacific Northwest of North America, which has a maritime climate somewhat similar to the UK, suggests that it may also be able to establish outside of London.

RECORDS OF *EULECANIUM EXCRESCENS* IN BRITAIN

Eulecanium excrescens has been found at thirteen private premises and one public garden in Greater London:

Belgravia (SW1), on *Wisteria* sp., 24.iv.2003, D. Alford; Chelsea (SW13), at five separate private gardens, on *Wisteria* sp., 8.v.2002 and 13.v.2002, PHSI; Chiswick (W4), private garden, on *Wisteria* sp., 1.v.2003, Mrs. Lang; Earl's Court (SW10), private garden, on *Wisteria* sp., 22.iv.2002, G. Watson; Kew (TW9), botanical garden, on *Wisteria* sp. (together with *Coccus hesperidum* L. and *Parthenolecanium corni* (Bouché)), 2.x.2003, PHSI; Northfields (W13), private garden, on *Wisteria* sp., 17.ii.2003, S. Ericson; South Kensington (SW7), private garden, on *Wisteria* sp., 28.v.2002, N. Coleman; Teddington (TW1), private garden, on *Wisteria* sp., 11.ii.2003, E. Twyman; Vauxhall (SE11), two adjacent private gardens, on *Wisteria* sp., 12.xi.2001, 21.i.2002, 16.ii.2002, 7.iv.2002, H. Renier, and on *Podranea ricasoliana*, *Prunus* sp. and *Wisteria* sp. (an enormous infestation), 17.iv.2002, PHSI.

ECONOMIC IMPORTANCE

Eulecanium excrescens feeds on plant phloem sap, which weakens the host and can cause leaf loss and slow dieback, as has been apparent on heavily infested *Wisteria* sp. in London. In addition, it eliminates excess sugar-rich plant sap as 'honeydew'; this encourages the growth of black sooty mould, detracting from the aesthetic appeal of ornamental plants, reducing their area of photosynthesis and promoting leaf drop.

In China, *E. excrescens* is recorded as a pest of apple, pear and peach trees and the predatory beetle *A. niveovariegatus* has been studied as a possible biological control agent (Deng, 1985). In California, where it is rare, it is not considered an economic pest (Gill, 1988).

CONCLUSIONS

Eulecanium excrescens is a polyphagous pest of economically important orchard trees in China and has been introduced accidentally into the USA and Britain. Large populations have been found at several locations in London and it is likely that the pest has been present outdoors for several years. What effect the organism may have on commercial orchards in the UK is unknown. Eradication of *E. excrescens* from the UK by chemical means would be difficult, as it is present on large woody plants in private premises and there are few, if any, fully effective control products available (MacLeod & Matthews, 2003).

Suspected outbreaks, or interceptions, of *E. excrescens* on growing plants should be reported to the local Defra Plant Health and Seeds Inspectorate office or to the PHSI HQ, York (Tel.: 01904 455174, Fax: 01904 455197) and samples should be submitted to the Central Science Laboratory for identification.

ACKNOWLEDGEMENTS

Andrew Halstead, senior entomologist of the RHS, Wisley, sent the initial sample to CSL. Dr Gillian Watson of the BMNH confirmed the original species identification and reported several populations of the scale to CSL. David Alford also notified CSL of a finding in London. Dr John Noyes of the BMNH identified the *Coccophagus*. This work was funded by the Plant Health Division, Defra.

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SHORT COMMUNICATIONS

Recent records of scarcer Ephemeroptera from Southern England.—Although rated as RDB2 in Bratton (1991) *Ephemera lineata* Eaton (Ephemeridae) is locally abundant in the Reading area on the Kennet and Holybrook, and also from the Tilehurst area where it can be abundant at light (Chris Raper, pers. comm.). Light trapping at Burghfield Mill (SU6770) in July 2003 attracted large numbers of *E. lineata*, and *E. vulgata* L. *Ephemera danica* Müller was the rarest of the three in the district, and only found close to the Holybrook, (SU6871), the silty sections of which, also yielded several distinctive larvae of *Brachycercus harrisella* Curtis (Caenidae) in May 2003.

On 28th June 2004, I caught a single adult male *E. lineata* in Bushy Park (TQ 1469) approximately 200 m from the Thames. This appears to be the first modern record from the London area, and the first in Middlesex since 1902. Previous records from VC21 were from Teddington in 1901, and Laleham in 1902. Subsequently, adults proved to be widespread and abundant on foliage, especially on lower branches of trees across the park, throughout July into early August. Given the distribution of adults, it would appear likely that it is breeding in the Longford River which crosses the park.

On 20th May 2004, I saw three male mayflies performing a 'yo-yoing' display flight adjacent to a recently created shallow pond, remote from any significant flowing water on Carswell Golf Course, Oxfordshire (SU3396). I caught one which proved to be *E. vulgata*, a puzzling record given the suggested association with muddy-bottomed rivers.

Siphonurus armatus Eaton (Siphonuridae) is described as being associated with lakes, ponds and slow flowing streams and rivers (Elliot & Humpesch, 1983). In Botany Bay-Fisher Lane Woods, Surrey (SU9834) this species occurs in small ephemeral streams, which are often reduced in summer to a series of stony bottomed pools, in which larvae were often abundant. It was first recorded in the late 1970s (Don Tagg pers. comm.), and was still present in the early 1990s at least. – JONTY DENTON, Kingsmead, Wield Road, Medstead, Hampshire, GU34 5NJ. JontyDenton@aol.com.

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